

# But what do you need to produce a But?

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CUCS-334-88  
January 1988

## **Abstract:**

We study the problem of *appropriately* generating connectives (e.g., 'but', 'because', 'since', 'however') in a discourse. We claim that connectives *operate* at the discourse level rather than the semantic level, and that they indicate *pragmatic* features of the units they connect. Therefore, in order to choose the appropriate connective, a surface generator must find in its input a set of *pragmatic* features that affect or are affected by the choice of a connective. We present such a set of features and show their role in a variety of examples of the connective 'but'.

**Topic Areas:** Language generation, discourse structure, pragmatics

## 1. The problem: generating pragmatic connectives in the stream of conversation

In order to express how their contribution fits into the stream of conversation, people often choose a pragmatic connector (such as 'but', 'although', 'since' or 'because') to link their turn to preceding turns. This class of words has been called 'discourse words' [Ducrot *et al* 80]. We claim that discourse words do not operate at the level of the truth-conditions of the units they connect, but at the level of discursive activity: they indicate how to interpret and relate a turn to previous or implicit ones, rather than indicating a logical connection between the contents of these units. The role of discourse words - or *clue words* - as discourse structure markers has been acknowledged in previous work (see [Reichman 85, Flowers *et al* 82, Cohen 87, Grosz & Sidner 86, Hirschberg & Litman 87]). We go further in this direction: connectives not only mark segment boundaries in discourse, they also identify and determine certain semantico-pragmatic features of the units they join and these indirectly constrain their surface linguistic structure.

The word 'but' is taken as an example throughout the paper. Our approach allows a unified description of the usage of 'but' in various situations. Not only does our description indicate that 'but' marks a discourse segment boundary, but it also identifies the features of the connected units that are affected by the presence of a 'but'.

More generally, we infer from the pragmatic nature of discourse words one crucial specification on the design of a surface generator able to produce such connectives: the input to such a system must contain more than just the logical content of the previous turns and of the turn to be generated. Since turns in a conversation are not linked by content only, the generator<sup>1</sup> must be provided with other features of the turns in order to adequately choose the proper connective, and adapt the surface form of the conjoints to this choice. What features are needed then, and how can they be used to generate an appropriate surface form? We present here a set of such features that allow selection of connectives for a variety of situations. We call the structure formed by these features an *interpretative format* for reasons that will be discussed soon. The choice of these features is based on the semantic theory of Ducrot [Ducrot 83, List 84] and on the pragmatic theory of Roulet [Roulet *et al* 85], as well as on our own analysis of naturally occurring examples.

## 2. Argumentative orientation and Topoi

(1) I want to buy it, but it is expensive.

The classical definition of 'but' indicates that the complex '*p but q*' expresses an opposition between *p* and *q* as illustrated in example (1). A formalization of this definition in logical terms would state the equivalence:

$p \text{ but } q \iff (p \text{ and } q) \text{ and } \text{opposition}(p, q)$

But consider now the following example:

(2):           A: It's beautiful  
                  B: but it's expensive.

Whatever representation is chosen to specify the semantics of the predicate *opposition*, it seems unlikely one would maintain that A and B in (2) can be in opposition. For it is well accepted in our society that beauty deserves a high price.

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<sup>1</sup>In this paper, we use 'generator' to refer to a surface generator that builds syntactic structure and makes lexical choices. Note that ultimately, some component of a language generation system must be responsible for identifying pragmatic features. We don't address in this paper how such identification would be done and how it would interact with the actions of a surface generator.

and we can reasonably accept the statement:

beautiful(x)  $\rightarrow$  expensive(x)

This implication would tend to show that A and B are more in 'agreement' than in 'opposition'.

Similarly, [Quirk *et al* 72] propose that '*p but q*' expresses the surprise of a locutor that *q* is true in view of *p*. Here again, aside from the fuzziness of the notion 'surprise', it is difficult to believe that B can be surprised by the expensiveness of an object given its beauty.

A computational account of clue words in argumentative discourses [Cohen 87] also has problems. Cohen presents a classification of clue words (derived from [Quirk *et al* 72]) related to an algorithmic model of argument understanding. In this model, arguments are logical propositions forming a tree. In such a tree, the root is a *claim* whereas the leaves provide *evidences* for their parent node. The role of connectives is to indicate how a proposition is related to the previous nodes - that is, where it fits in the tree. In this account, a construction *P but Q* would indicate that *Q* is either a child or a sibling of *P* - that is, that *Q* is either evidence for *P*, or *Q* and *P* are both evidence for a common proposition *R*. Cohen uses the same device to represent both evidence and counter-evidence. Consequently, there is no way to distinguish between *reformulative* connectives (e.g., 'in other words' or 'namely') and *contrastive* connectives (e.g., 'but', 'however'): both are represented by a parent/child relation. There is even less of a mechanism to distinguish between two contrastive connectives, like 'although' and 'but'. The structural indication given by 'but' is a worthy indication, but it is far from being a description of the meaning of 'but' and does not help in explaining example (2).

More satisfying for analyzing example (2) is the description of 'but' given in [Ducrot *et al* 80]. In *p but q*, *p* is presented as an argument for a certain conclusion *r*, and *q* as an argument for the opposite conclusion *not(r)*. The interpretation of *p but q* requires the instantiation of what Ducrot calls the *argumentative variable r*.

In our example, such a conclusion could be:

A: It's beautiful [--> I want to buy it]

B: But it's expensive [--> you don't want to buy it].

The opposition between A and B is in this perspective *indirect* and requires the identification of an implicit conclusion. To describe this identification process, [Anscombre & Ducrot 83] hypothesize a set of very particular principles that they call *topoi*. *Topoi* are gradual inference rules of the form "*the more/less x is P, the more/less y is Q*". *x* and *y* being arbitrary objects and *P* and *Q* gradual properties.

In example (2), the *topoi* supporting the interpretation we have proposed would be:

(T1) The more an object is beautiful, the more a person wants to buy it.

(T2) The more an object is expensive, the less a person wants to buy it.

What are the conclusions we can draw from this analysis? B's reply in (2) is not linked to the content of A's first turn, but to an interpretation of this turn that hypothesizes an argumentative orientation in it, and that is based on a particular *topos*. To explain the choice of 'but' in this case, we need to refer to the propositions (*r* and *not(r)*) presented as a conclusion of each of the turns (we call this conclusion the *argumentative orientation* of an utterance) and to the *topoi* relating these conclusions to an aspect of the logical content of the turns.

The important characteristic of these features is that they are not part of the semantics of the sentences we consider. They are part of the **interpretation** of the utterances in a given situation by a given locutor that justifies the use of a 'but' in his sentence. From a generation perspective, it means that **the argumentative features of the turn we want to generate must be part of the input to a surface generator.**

We propose an informal description of 'but' based on a slight modification of the one proposed in [Ducrot *et al* 80]. 'But' is the marker of the following interpretative move between two locutors A and B: A says  $p$ , B replies: "you pretend to conclude  $r$  through  $p$ , but you cannot because  $q$ , therefore  $not(r)$ "<sup>2</sup>. But in order to account for the incredible versatility of 'but' attested in transcripts of real conversations, we need to add some flexibility to this description. We need to determine not only the conclusion  $r$  left implicit in the move, but also the features of  $p$  and  $q$  that are at the source of the move. And much of the flexibility of 'but' comes from the large choice available here. We extend Ducrot's model by proposing a formal description of the features of  $p$  and  $q$  that are relevant for the choice of a connective.

### 3. What is the theme of a turn?

- (3)                   A: Can you close the door?  
                          B: But I'm not your slave!

If we want to apply the argumentative description of 'but' to example (3) we must come up with a conclusion  $r$  of the type "A has authority over B". The whole interpretation would be:

- A: I order you to close the door [--> I have authority over you]  
B: But I'm not your slave [--> you have no authority over me]

Using the topoi:

- T1: The more X gives orders to Y, the more X has authority over Y  
T2: The more X is the slave of Y, the more Y has authority over X

When we look for a conclusion  $r$  to instantiate the model ' $p$  but  $q$ ', we actually look for a topoi having  $r$  as a conclusion and a thematic property of  $p$  as a premise. The problem with example (3) is that A did not talk about the act of ordering and yet this is the theme B chose to elaborate on. So what can function as the theme<sup>3</sup> of a turn, and how can we access it? In (2), the theme of  $p$  was the expensiveness of the object - that is, a property mentioned in the propositional content of  $p$ . Here the theme is a property of the speech act achieved by  $p$ .

If we represent the act realized by an utterance as IF(PC) - where IF is an illocutionary force and PC a propositional content (see [Searle & Vanderveken 85]) - then the theme of an utterance can be derived either from IF or from PC. It is, however, a distinctive property of 'but' to allow a linking on IF. Other connectives require the linking to be made on PC only (e.g., 'although').

(3) shows that the theme is not a property of the semantic content of a turn (PC), but a pragmatic feature. It is something that needs to be extracted from the linguistic form during interpretation. We have used two procedures of *thematization* so far (see [Moeschler 86, Auchlin 86]): the thematization of a speech act in (3), and the argumentative

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<sup>2</sup>Our complete model accounts for the possibility of one locutor uttering 'p but q' at once by the notion of polyphony introduced in [Ducrot 83]

<sup>3</sup>we use here the term 'theme' in an informal way that does not correspond to the technical opposition 'theme/rheme'.

analysis in (2). The recovery of the theme is done under constraints, where the use of connectives such as 'but' is one such constraint. Our introduction of thematization procedures into the model allows for great flexibility in what can function as theme. It means that a proposition  $p$  can be interpreted differently in different situations allowing for a variety of themes to be produced.

We draw two conclusions from this analysis: the theme is a pragmatic feature of the turns, and needs to be part of the input to a generator. For a generator, our introduction of thematization procedures allows the production of implicit themes.

#### 4. Functional status of turns in a conversation

Let us now consider the following example, taken from a transcript of a naturally occurring conversation, recorded during an experiment we organized. The participants were asked to cooperatively build a crane using a toy construction set and provided with separate instructions.

- (4) Y1: I have a description on the back of my instruction set with the numbers 12 and 21 in circles.  
Do both of you have the same numbers?
- W2: Yes, the numbers are on the back, but there are pictures of the crane on mine.
- Y3: I also have pictures. I was just wondering if we got different things.

We propose here an interpretation of W2. We are aware that many other interpretations would be possible given this fragment. We are not in quest of the "real meaning" of W2. We simply show how our model would allow for this possible interpretation. To interpret W2, we need to find how the first segment "Yes, the numbers are on the back" is linked to its preceding turn, Y1. On the surface Y1 is a question that can be interpreted in at least the two following ways:

- Y1-1: A request for information: Y does not know, and wants to know whether the other players have the same numbers on the same page.
- Y1-2: A request for identification: Y is looking at a sheet of his instruction set and wants the others to identify the same sheet before asking them to do something with this sheet.

The answer Y3 indicates that Y understands that W has chosen the second interpretation (identification) over the first (information, that Y actually intended). What role could 'but' have played in Y's interpretation of W2?

In order to analyze this example, we follow [Roulet *et al* 85] in distinguishing between *directive* and *subordinate* speech acts in a conversation. Intuitively, among the many speech acts accomplished in a turn, the directive act is the point of the turn - the reason why the locutor started talking. The other acts are subordinate to this directive act and support it in some way (e.g., as a preparation for it or as a justification) Using this notion, it is possible to find a distinction between the two possible interpretations of Y1: Y1-1, a request for information, is a directive act, whereas Y1-2, a request for identification, is a subordinate act. Y1-1 stands for itself - Y wants to know, that's it - whereas Y1-2 is a preparation for an expected coming act.

We introduce a new aspect to our description of 'but': in a segment ' $p$  but  $q$ ',  $p$  has a subordinate status, and  $q$  is directive. Now, the first segment of W2 is an answer to Y1, as is marked by the "yes". It also has subordinate status by

our definition of 'but'. This means that W considers the question as a subordinate act<sup>4</sup>. From Y's perspective, as he meant the question simply as a request for information (Y1-1, a directive act), the answer *p but q* is simply inappropriate here.

What conclusions can be drawn from this example? We have implicitly adopted here one of Roulet's assumptions: the interpretation of a linguistic segment depends on its position in a larger discourse. To account for that context dependency, [Roulet *et al* 85] propose a hierarchical model of discourse structure. In this model, each unit is made up of lower level units. Within a complex unit, constituents are attributed a *functional status*. Among the acts forming a unit, one is distinguished and called the *directive act*. The other constituents are called *subordinate*. The criterion to distinguish the directive act is that it cannot be suppressed from the unit without changing its interpretation. Subordinate acts in contrast are 'optional', and can be removed without changing the interpretation of the whole segment<sup>5</sup>. The directive or subordinate character of a turn must be part of the description of a conversation. From our generation perspective, it means the input to a generator must contain an indication of the functional status of the turns to be produced.

## 5. Re-interpretation

Example (5): Mr. Meteo

In a newspaper, the weather forecast starts with a long paragraph on techniques to choose sex of children. The last sentence is: We will all end up gays, Women's Lib will die from extinction, hey! it's worth it!  
BUT, for the weather, it is not worth much.

[Example taken from [Roulet *et al* 85]]

The 'but' here is problematic.<sup>6</sup> None of the thematization procedures presented so far can reconcile the content of the first paragraph and a statement about the weather. No topos seems accessible from the two themes presented. The speech acts do not provide any further help. However, one way to reach an interpretation for this 'but' is the following:

First paragraph: the theme is "techniques to choose sex of children."  
Last sentence is the conclusion of the paragraph. It produces the interpretation "the article is finished".  
BUT links on this interpretation:  
"you think the article is finished, but the real article is just starting now, and the real theme is the weather".

Here the link we can make between 'but' and the text preceding it is again indirect: we don't link on the content of the paragraph, nor on an implicit conclusion reachable from this content, nor on the speech act realized in the first paragraph. We link on the fact that a first paragraph has been produced and has been interpreted. This potential interpretation is taken as the *p* needed in our description of 'but'.

What actually are the features of the interpretation that are used in this example? The functional status of the units plays an important role: the first paragraph has all the characteristics of a directive unit. When 'but' is interpreted,

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<sup>4</sup>The relation between the status of the question and the status of the answer is studied in more depth in our complete model.

<sup>5</sup>The notion of pragmatic subordination can be marked in surface (for example by a tag question), but it is not directly related to syntactic subordination

<sup>6</sup>Of course the content is problematic as well, but this is not relevant to our discussion.

however, the status of the first paragraph is modified. It becomes a preparation, or an introduction to the real directive unit of the whole article. The 'but' constrains the interpretation of the first segment in a powerful manner: it forces the reader to consider it as a subordinate unit. The indications given by the 'but' are strong enough to overrule the conclusions of a first interpretation. Following [Roulet *et al* 85], we call this kind of move *re-interpretation*. We define a re-interpretation as an operation which takes as input a previous interpretation. This interpretation includes the specification of the pragmatic features described in this paper: argumentative orientation, functional status, illocutionary force or theme. A re-interpretative move makes one of these specifications the theme of the discourse and assigns it a new value. In the full paper, we will present a formal mechanism, called *strategic format*, to account for this example more completely.

We have seen two examples of re-interpretation: in (4), Y3 re-interprets the illocutionary force of Y1; in (5), the 'but' re-interprets the functional status of the first paragraph. We can see re-interpretation as a new type of thematization procedure: it takes the interpretation of a turn as the theme in a connection.

## 6. Interpretative Formats: an input for a generator.

In the preceding sections, we have analysed five examples and presented different features of the interpretation process. We now present a formalism that synthesizes the observations made so far.

We represent an interpretation as a complex description formed of the following features:

```
I(s) = [
    utterer (U)
    link between locutor and utterer (LU)
    propositional content (PC)
    illocutionary force (IF)
    theme (Th)
    thematization procedure (ThP)
    argumentative orientation (AO)
    discourse law supporting the interpretation (DL)
    functional status (FS)]
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We call such a structure an *interpretative format*. We define its features, most of which have been presented in the preceding sections, as follows:

- The *utterer* of a turn is an abstract entity related to but distinct from the locutor. The two first features, U and LU, account for an important aspect of language use (*polyphony* as presented in [Ducrot 83]) but are not presented in this paper.
- The *propositional content* of a turn is the notion used in the theory of speech acts ([Searle & Vanderveken 85]). We are not committed at this point to any particular representation, whether a predicate-argument structure or network-like representations.
- The *illocutionary force* is the final speech act derived from the sentence. It includes any derivation from a surface speech act to an indirect one. For example, for an utterance of "can you close the door?" the value of this feature will often be *imperative*.
- The *theme* is a set of discursive objects. Discursive objects can be any of the objects, properties or relations denoted by the propositional content, or, as we have seen in the examples, a property derived from the argumentative, illocutionary or functional specifications of an utterance. We currently represent the theme as a flat set, but plan on having a hierarchy of themes representing the focusing structure of the utterance.
- The *thematization procedure* indicates how the theme has been promoted to the status of theme. We have inventoried four types of procedures so far:
  - Propositional content: this is the 'normal' situation, where the theme is chosen from the content of the sentence as in example (1).

- **Argumentative derivation:** (cf example (2)). The theme common to the two conjoints of the 'but' is argumentatively derived from the propositional content.
- **Illocutionary thematization:** (cf example (4)). The speech act realized in an utterance becomes the theme of the connection.
- **Re-interpretation:** (cf example (5)). One of the interpretative specifications of a previous utterance becomes the theme of the connection.
- The *argumentative orientation* of an utterance is the conclusion that it implies. It has the following format:  $O_i$  has degree  $\delta$  on the scale  $\sigma$ , where  $O_i$  is a discursive object from the theme and  $\sigma$  an *argumentative scale*. Each scale is quantified in specific gradations, determining the possible values of  $\delta$ . For example, the scale "heat" has degrees {icy, cold, lukewarm, warm, hot}.
- The *discourse law* is a *topos*, explaining the derivation of the argumentative orientation. We represent topoi as pairs of scales with a sign indicating their polarity: (+/-  $\sigma_1$ , +/-  $\sigma_2$ ).
- The *functional status* indicates whether the utterance has a directive or subordinate role in the discourse.

We represent a connector like 'but' as a *relation between interpretative formats*. Therefore, in order to produce a 'but', a generator is provided with a set of interpretative formats as input. If these formats satisfy the relation, a 'but' can be produced. Similarly other connectives can be selected. The description of 'but' is a set of constraints on two interpretative formats  $P$  and  $Q$ . It specifies that:

- the two utterers of  $P$  and  $Q$  must be distinct<sup>7</sup>.
- the intersection of the themes of  $P$  and  $Q$  must be non-empty.
- Any kind of thematization procedure can be used for both  $P$  and  $Q$ .
- The argumentative orientations of  $P$  and  $Q$  must be on the same scale, and  $P$  must have a lesser degree than  $Q$ .  $P.AO = (O, \delta_1, \sigma)$  and  $Q.AO = (O, \delta_2, \sigma)$  and  $\delta_1 <_{\sigma} \delta_2$  and  $O$  is an element of the intersection of the themes of  $P$  and  $Q$ .
- The topoi used for  $P$  and  $Q$  must have their right-hand sides of different polarities: if  $P.DL = (... , +\sigma)$  then  $Q.DL = (... , -\sigma)$  and *vice-versa*.
- $P$  must have a subordinate status and  $Q$  a directive status.

## 7. Related work

Our approach to connectives is original in its focus on linguistic (surface) effects. Previous work has been more concerned with the study of structure (cf [Cohen 87, Flowers *et al* 82, Grosz & Sidner 86, Hirschberg & Litman 87]).

As noted earlier, Cohen's work deals with connectives only as structural markers ([Cohen 87]). We diverge from her approach to connectives on fundamental issues. Cohen classifies connectives only on their structural properties - whether they indicate a parent/child or sibling relation. This approach is, however, insufficient to distinguish between the many connectives available in natural languages - 'but' and 'although' share the same structural properties (they indicate a parent/child relation) and are part of the same group of contrastive connectives in the classification used in [Cohen 84]. Such a limitation comes from the exclusive consideration of content in the structure built: Cohen defines the relation of evidence (or 'being an argument for') as a relation between logical propositions (a logical implication). In contrast, we view the same relation as a relation between sentences - that is between linguistic entities carrying much more information than a propositional content.

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<sup>7</sup>But the locutors can be the same. This device allows us to account for the possibility of a single speaker expressing different points of view.



[Grosz & Sidner 86] propose a general approach to discourse structure. They view discourse structure as the combination of three components: a linguistic structure, an attentional (or focusing) structure, and an intentional structure. The linguistic structure they use is actually a segmentation of a text. Similarly to Cohen's approach, connectives within this theory are perceived as structure markers: connectives (and other surface markers) mark segment boundaries. They propose to classify connectives according to the change they mark on the other components of the discourse structure - attentional and intentional. This approach is therefore richer than Cohen's classification, since it does not take content as the only input for building the discourse structure. Their classification of clue phrases is limited, however, to indicating whether a clue phrase marks a 'push' or a 'pop' in the focus stack associated with the discourse. Furthermore, at this point, they do not show what the definition of a clue word would be. Thus, more work needs to be done in this theory before it can be evaluated.

Using a similar framework for the description of connectives, [Hirschberg & Litman 87] claim that connectives can have two interpretations: cue and non-cue. A cue interpretation indicates a transition in the discourse structure, whereas a non cue interpretation modifies the truth conditions of the sentence. They study the way intonation can be used to discriminate between cue and non-cue usage of 'now'. But in our view separate definitions are not needed. The same description of 'but' can capture both non-cue (as in examples (1), (2) and (3)) and cue usages (as in examples (4) and (5)).

## 8. Conclusion and Future work.

In our study of what makes a sequence of two turns coherent, we found that the connection between turns is actually a relation between two interpretations of propositions and not between the propositions themselves. Our use of interpretative formats captures relevant pragmatic features of consecutive turns as identified in our analysis. Ultimately, this representation will allow the selection of a coherent connector by a language generator.

Our representation plays a role in the larger theoretical framework presented in [Ducrot 83]. Following Ducrot, the semantics of connectives is not limited to the determination of truth-conditions of sentences. In particular, we adopt the use of argumentative orientations and topoi as part of our interpretative format. We found, however, that these pragmatic features were not adequate to explain the examples we studied. In addition, we use the notion of the functional status of a turn [Roulet *et al* 85] and add a new feature, theme, along with a thematization procedure. Such a procedure is essential if a language generator is to produce connectives that link turns through implicit themes.

In sum, our representation synthesizes the theoretical work of Ducrot and Roulet, formalizes it so that it can be used computationally and extends it by adding a thematization procedure. Our analysis and formalism provides the groundwork necessary for implementation of a generator to produce connectives and that is our current focus.

## References

- [Anscombre & Ducrot 83] Anscombre, J.C. & Ducrot, O.  
*Philosophie et langage: L'argumentation dans la langue.*  
Pierre Mardaga, Bruxelles, 1983.
- [Auchlin 86] Auchlin, A.  
Complementarite des structures thematiques et fonctionnelles pour l'accès aux interpretations dans le discours.  
*Cahiers de Linguistique Francaise (7)*:pages 169-188, 1986.
- [Cohen 84] Cohen, R.  
A computational theory of the function of clue words in argument understanding.  
In *Coling84*, pages 251-258. COLING, Stanford, California, July, 1984.
- [Cohen 87] Cohen, R.  
Analysing the structure of argumentative discourse.  
*Computational Linguistics* 13(1-2):11-24, 1987.
- [Ducrot 83] Ducrot, O.  
*Le sens commun: Le dire et le dit.*  
Les editions de Minuit, Paris, 1983.
- [Ducrot et al 80] Ducrot, O. et al.  
*Le sens commun: Les mots du discours.*  
Les editions de Minuit, Paris, 1980.
- [Flowers et al 82] Flowers, M., McGuire, R., and Birnbaum, L.  
Adversary arguments and the logic of personal attacks.  
*Strategies for natural language processing.*  
Lawrence Erlbaum, Hillsdale, NJ, 1982, pages 275-294.
- [Grosz & Sidner 86] Grosz, B. and Sidner, C.  
Attentions, intentions, and the structure of discourse.  
*Computational Linguistics* 12(3):175-204, 1986.
- [Hirschberg & Litman 87] Hirschberg, J. and Litman, D.  
Now let's talk about Now: identifying clue phrases intonationally.  
In *Proceedings of the 25th Conference of the ACL*, pages 163-171. Association for Computational Linguistics, 1987.
- [List 84] List, K.L.  
*Coherence and Cohesion: contextualization of Oswald Ducrot's general theory of linguistic semantics.*  
PhD thesis, University of Michigan, 1984.
- [Moeschler 86] Moeschler, J.  
Connecteurs pragmatiques, lois de discours et strategies interpretatives: parce que et la justification enonciative.  
*Cahiers de Linguistique Francaise (7)*:pages 149-168, 1986.
- [Quirk et al 72] Quirk, R. et al.  
*A Grammar of Contemporary English.*  
Longman, 1972.
- [Reichman 85] Reichman, R.  
*Getting computers to talk like you and me: discourse context, focus and semantics (an ATN model).*  
MIT press, Cambridge, Ma, 1985.

[Roulet *et al* 85] Roulet, E. *et al.*  
*L'articulation du discours en français contemporain.*  
Berne, Lang, 1985.

[Searle & Vanderveken 85]  
Searle, J. and Vanderveken, D.  
*Foundations of Illocutionary Logic.*  
Cambridge University Press, Cambridge, 1985.